

Shortname: OMSO2  
Longname: OMI/Aura Sulphur Dioxide (SO2) Total Column 1-Orbit L2 Swath 13x24 km  
PFS Version: 1.0.3  
Date: 16 April 2010  
Author(s): Kai Yang, Nick Krotkov, Simon Carn, Arlin J. Krueger

PGE Version: 1.1.3 and later  
Lead Algorithm Scientist: Nick Krotkov, Arlin J. Krueger  
Lead Algorithm Developer: Kai Yang  
Lead PGE Developer: Kai Yang  
PGE Developer(s): Simon Carn

Description: >

This document specifies the product format for the Version 1.1.3 and subsequent delivery of the OMSO2 L2 PGE, which uses OMTO3 L2 measurements to estimate the total column amount of SO2. The product is stored as one HDF-EOS 5 swath file for each granule (i.e., one orbit) of OMTO3 L2 data, and has a size range of 5 to 50 Mb.

Global Metadata:

- Metadata Name: AuthorAffiliation  
Mandatory: T  
Data Type: HE5T\_NATIVE\_CHAR  
Number of Values: 1  
Range or Valid: Not applicable (free format).  
Data Source: PCF  
Description: Actual is "JCET".
- Metadata Name: AuthorName  
Mandatory: T  
Data Type: HE5T\_NATIVE\_CHAR  
Number of Values: 1  
Range or Valid: Not applicable (free format).  
Data Source: PCF  
Description: >  
Actual is "N. Krotkov, K. Yang, S. Carn, A.J. Krueger".
- Metadata Name: GranuleDay  
Mandatory: T  
Data Type: HE5T\_NATIVE\_INT  
Number of Values: 1  
Range or Valid: Range is 1 to 31.

Data Source: PGE  
Description: >  
The day of the month at the start of the granule.

- Metadata Name: GranuleMonth  
Mandatory: T  
Data Type: HE5T\_NATIVE\_INT  
Number of Values: 1  
Range or Valid: Range is 1 to 12.  
Data Source: PGE  
Description: The month at the start of the granule.

- Metadata Name: GranuleYear  
Mandatory: T  
Data Type: HE5T\_NATIVE\_INT  
Number of Values: 1  
Range or Valid: Range is 2000 to 2099.  
Data Source: PGE  
Description: >  
The (four-digit) year at the start of the granule.

- Metadata Name: HDFEOSVersion  
Mandatory: T  
Data Type: HE5T\_NATIVE\_CHAR  
Number of Values: 1  
Range or Valid: Automatically set by HDF-EOS.  
Data Source: HE  
Description: Example is "HDFEOS\_5.1.5".

- Metadata Name: InputVersions  
Mandatory: T  
Data Type: HE5T\_NATIVE\_CHAR  
Number of Values: 1  
Range or Valid: Not applicable (free format).  
Data Source: PGE  
Description: >  
A list of every ESDT (including version) whose product was used as input for the processing.

- Metadata Name: InstrumentName  
Mandatory: T  
Data Type: HE5T\_NATIVE\_CHAR  
Number of Values: 1  
Range or Valid: Valid are "HIRDLS", "MLS", "OMI" and "TES".  
Data Source: PCF  
Description: Actual is "OMI" (see Section 6.1 of Reference 2).

- Metadata Name: OrbitData  
Mandatory: T  
Data Type: HE5T\_NATIVE\_CHAR  
Number of Values: 1  
Range or Valid: Valid are "DEFINITIVE" and "PREDICTED".  
Data Source: L1B  
Description: >  
Indicates whether orbit data used by the L1B processor is definitive or predicted.

- Metadata Name: PGEVERSION  
Mandatory: T  
Data Type: HE5T\_NATIVE\_CHAR  
Number of Values: 1  
Range or Valid: Range is "0.0.0" to "9.9.99".  
Data Source: PCF  
Description: Actual is "0.1.0".

- Metadata Name: ProcessingCenter  
Mandatory: T  
Data Type: HE5T\_NATIVE\_CHAR  
Number of Values: 1  
Range or Valid: Not applicable (free format).  
Data Source: PCF  
Description: Example is "OMIDAPS".

- Metadata Name: ProcessingHost  
Mandatory: T  
Data Type: HE5T\_NATIVE\_CHAR  
Number of Values: 1  
Range or Valid: Not applicable (free format).  
Data Source: PCF  
Description: >  
The output from executing the Unix "uname -a" command on the processing machine.

- Metadata Name: ProcessLevel  
Mandatory: T  
Data Type: HE5T\_NATIVE\_CHAR  
Number of Values: 1  
Range or Valid: Valid are "1b", "2" and "3".  
Data Source: PCF  
Description: Actual is "2".

- Metadata Name: TAI93At0zOfGranule

Mandatory: T  
Data Type: HE5T\_NATIVE\_DOUBLE  
Number of Values: 1  
Range or Valid: Range is 0.0d+00 to 1.0d+30.  
Data Source: PGE  
Description: >  
The TAI93 time at 0z of the granule (see Section 6.1 of Reference 2).

#### Swath Metadata:

- Metadata Name: SwathName  
Mandatory: T  
Data Type: HE5T\_NATIVE\_CHAR  
Number of Values: 1  
Range or Valid: Valid is "OMI Total Column Amount SO2".  
Data Source: PGE  
Description: Actual is "OMI Total Column Amount SO2".
- Metadata Name: VerticalCoordinate  
Mandatory: T  
Data Type: HE5T\_NATIVE\_CHAR  
Number of Values: 1  
Range or Valid: >  
Valid are "Pressure", "Altitude", "Potential Temperature",  
"Slant Column" and "Total Column".  
Data Source: PGE  
Description: >  
Actual is "Total Column" (see Section 6.2 of Reference 2).

#### Swath Dimensions:

- Dimension Name: nTimes  
Data Type: HE5T\_NATIVE\_INT  
Dimension Type: FIXED  
Number of Values: 1  
Range or Valid: Range is 0 to 9999.  
Data Source: L1B  
Description: The number of "scan" lines in the swath.
- Dimension Name: nXtrack  
Data Type: HE5T\_NATIVE\_INT  
Dimension Type: FIXED  
Number of Values: 1  
Range or Valid: Range is 1 to 60.

Data Source: L1B  
Description: The number of ground pixels per "scan" line.

#### Geolocation Fields:

- Field Name: GroundPixelQualityFlags  
Data Type: HE5T\_NATIVE\_UINT16  
Dimensions: nTimes,nXtrack  
Range or Valid: Range is 0 to 65534.  
Missing Value: 65535  
Offset: 0.0d0  
Scale Factor: 1.0d0  
Units: NoUnits  
Data Source: L1B

Title: "Ground Pixel Quality Flags"

Unique Field Definition: TOMS-OMI-Shared

Description: >

Bits 0 to 3 together contain the land/water flags:

- 0 - shallow ocean
- 1 - land
- 2 - shallow inland water
- 3 - ocean coastline/lake shoreline
- 4 - ephemeral (intermittent) water
- 5 - deep inland water
- 6 - continental shelf ocean
- 7 - deep ocean
- 8-14 - not used
- 15 - error flag for land/water

Bits 4 to 6 are flags that are set to 0 for FALSE, or 1 for TRUE:

- Bit 4 - sun glint possibility flag
- Bit 5 - solar eclipse possibility flag
- Bit 6 - geolocation error flag

Bit 7 is reserved for future use (currently set to 0).

Bits 8 to 14 together contain the snow/ice flags (based on NISE):

- 0 - snow-free land
- 1-100 - sea ice concentration (percent)
- 101 - permanent ice (Greenland, Antarctica)
- 102 - not used
- 103 - dry snow
- 104 - ocean (NISE-255)
- 105-123 - reserved for future use
- 124 - mixed pixels at coastline (NISE-252)

- 125 - suspect ice value (NISE-253)
- 126 - corners undefined (NISE-254)
- 127 - error

Bit 15 - NISE nearest neighbor filling flag.  
(See Section 6.2 of Reference 4 for more details.)

- Field Name: Latitude  
 Data Type: HE5T\_NATIVE\_FLOAT  
 Dimensions: nTimes,nXtrack  
 Range or Valid: Range is -90.0 to 90.0.  
 Missing Value: "-0X1P+100 (C language representation)"  
 Offset: 0.0d+00  
 Scale Factor: 1.0d+00  
 Units: deg  
 Data Source: L1B  
 Title: "Geodetic Latitude"  
 Unique Field Definition: TOMS-Aura-Shared  
 Description: >  
 The geodetic latitude (in deg) at the center of the ground pixel.

- Field Name: Longitude  
 Data Type: HE5T\_NATIVE\_FLOAT  
 Dimensions: nTimes,nXtrack  
 Range or Valid: Range is -180.0 to 180.0.  
 Missing Value: "-0X1P+100 (C language representation)"  
 Offset: 0.0d+00  
 Scale Factor: 1.0d+00  
 Units: deg  
 Data Source: L1B  
 Title: "Geodetic Longitude"  
 Unique Field Definition: TOMS-Aura-Shared  
 Description: >  
 The geodetic longitude (in deg) at the center of the ground pixel.

- Field Name: RelativeAzimuthAngle  
 Data Type: HE5T\_NATIVE\_FLOAT  
 Dimensions: nTimes,nXtrack  
 Range or Valid: Range is -180.0 to 180.0.  
 Missing Value: "-0X1P+100 (C language representation)"  
 Offset: 0.0d+00  
 Scale Factor: 1.0d+00  
 Units: deg(EastofNorth)  
 Data Source: L1B  
 Title: >  
 "Relative Azimuth Angle (sun + 180 - view)"

Unique Field Definition: TOMS-Aura-Shared

Description: >

The relative (sun + 180 - view) azimuth angle (in deg) at the center of the ground pixel.

- Field Name: SecondsInDay  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nTimes  
Range or Valid: Range is 0.0 to 86401.0.  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d+00  
Scale Factor: 1.0d+00  
Units: s  
Data Source: L1B  
Title: "Seconds after UTC midnight"  
Unique Field Definition: TOMS-Aura-Shared  
Description: >  
The time (in s) after UTC midnight at the start of the "scan".

- Field Name: SolarAzimuthAngle  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nTimes,nXtrack  
Range or Valid: Range is -180.0 to 180.0.  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d+00  
Scale Factor: 1.0d+00  
Units: deg(EastofNorth)  
Data Source: L1B  
Title: "Solar Azimuth Angle"  
Unique Field Definition: TOMS-Aura-Shared  
Description: >  
The solar azimuth angle (in deg) at the center of the ground pixel.

- Field Name: SolarZenithAngle  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nTimes,nXtrack  
Range or Valid: Range is 0.0 to 180.0.  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d+00  
Scale Factor: 1.0d+00  
Units: deg  
Data Source: L1B  
Title: "Solar Zenith Angle"  
Unique Field Definition: TOMS-Aura-Shared  
Description: >  
The solar zenith angle (in deg) at the center of the ground pixel.

- Field Name:           SpacecraftAltitude  
Data Type:           HE5T\_NATIVE\_FLOAT  
Dimensions:          nTimes  
Range or Valid:       Range is 4.0E05 to 9.0E05.  
Missing Value:       "-0X1P+100 (C language representation)"  
Offset:              0.0d+00  
Scale Factor:         1.0d+00  
Units:                m  
Data Source:          L1B  
Title:                "Spacecraft Altitude"  
Unique Field Definition: TOMS-Aura-Shared  
Description: >  
Height above WGS84 ellipsoid.

- Field Name:           SpacecraftLatitude  
Data Type:           HE5T\_NATIVE\_FLOAT  
Dimensions:          nTimes  
Range or Valid:       Range is -90.0 to 90.0.  
Missing Value:       "-0X1P+100 (C language representation)"  
Offset:              0.0d+00  
Scale Factor:         1.0d+00  
Units:                deg  
Data Source:          L1B  
Title:                "Spacecraft Latitude"  
Unique Field Definition: TOMS-Aura-Shared  
Description: >  
Geodetic latitude above WGS84 ellipsoid.

- Field Name:           SpacecraftLongitude  
Data Type:           HE5T\_NATIVE\_FLOAT  
Dimensions:          nTimes  
Range or Valid:       Range is -180.0 to 180.0.  
Missing Value:       "-0X1P+100 (C language representation)"  
Offset:              0.0d+00  
Scale Factor:         1.0d+00  
Units:                deg  
Data Source:          L1B  
Title:                "Spacecraft Longitude"  
Unique Field Definition: TOMS-Aura-Shared  
Description: >  
Geodetic longitude above WGS84 ellipsoid.

- Field Name:           TerrainHeight  
Data Type:           HE5T\_NATIVE\_INT16  
Dimensions:          nTimes,nXtrack



Range or Valid: Range is -100.0 to 10000.0.  
Missing Value: -32767  
Offset: 0.0d+00  
Scale Factor: 1.0d+00  
Units: m  
Data Source: L1B  
Title: "Terrain Height"  
Unique Field Definition: TOMS-Aura-Shared  
Description: >  
The terrain height (in m) at the center of the ground pixel (from the OMI Level 1B file).

- Field Name: Time  
Data Type: HE5T\_NATIVE\_DOUBLE  
Dimensions: nTimes  
Range or Valid: Range is -5.0D09 to 1.0D10.  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d+00  
Scale Factor: 1.0d+00  
Units: s  
Data Source: L1B  
Title: "Time at Start of Scan (TAI93)"  
Unique Field Definition: TOMS-Aura-Shared  
Description: >  
The TAI93 time (in s) at the start of the "scan".

- Field Name: ViewingAzimuthAngle  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nTimes,nXtrack  
Range or Valid: Range is -180.0 to 180.0.  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d+00  
Scale Factor: 1.0d+00  
Units: deg(EastofNorth)  
Data Source: L1B  
Title: "Viewing Azimuth Angle"  
Unique Field Definition: TOMS-Aura-Shared  
Description: >  
The viewing azimuth angle (in deg) at the center of the ground pixel.

- Field Name: ViewingZenithAngle  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nTimes,nXtrack  
Range or Valid: Range is 0.0 to 70.0.  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d+00

Scale Factor: 1.0d+00  
Units: deg  
Data Source: L1B  
Title: "Viewing Zenith Angle"  
Unique Field Definition: TOMS-Aura-Shared  
Description: >  
The viewing zenith angle (in deg) at the center of the ground pixel.

#### Data Fields:

- Field Name: AlgorithmFlag\_PBL  
Data Type: HE5T\_NATIVE\_UINT8  
Dimensions: nTimes,nXtrack  
Range or Valid: Range is 0 to 16.  
Missing Value: 255  
Offset: 0.0d+00  
Scale Factor: 1.0d+00  
Units: NoUnits  
Data Source: PGE  
Title: "Algorithm Flag for PBL"  
Unique Field Definition: OMI-Specific  
Description: >  
The PBL processing flag for each ground pixel, indicating the algorithm path:  
0 - skipped  
1 - linear fitting, vertical column SO<sub>2</sub>, short wavelength window  
2 - linear fitting, vertical column SO<sub>2</sub>, long wavelength window  
Add 10 for snow/ice

- Field Name: AlgorithmFlag\_TRL  
Data Type: HE5T\_NATIVE\_UINT8  
Dimensions: nTimes,nXtrack  
Range or Valid: Range is 0 to 16.  
Missing Value: 255  
Offset: 0.0d+00  
Scale Factor: 1.0d+00  
Units: NoUnits  
Data Source: PGE  
Title: "Algorithm Flag for TRL"  
Unique Field Definition: OMI-Specific  
Description: >  
The TRL processing flag for each ground pixel, indicating the algorithm path:  
0 - skipped  
1 - linear fitting, vertical column SO<sub>2</sub>, short wavelength window  
2 - linear fitting, vertical column SO<sub>2</sub>, long wavelength window  
Add 10 for snow/ice

- Field Name: AlgorithmFlag\_TRM  
 Data Type: HE5T\_NATIVE\_UINT8  
 Dimensions: nTimes,nXtrack  
 Range or Valid: Range is 0 to 16.  
 Missing Value: 255  
 Offset: 0.0d+00  
 Scale Factor: 1.0d+00  
 Units: NoUnits  
 Data Source: PGE  
 Title: "Algorithm Flag for TRM"  
 Unique Field Definition: OMI-Specific  
 Description: >  
 The TRM processing flag for each ground pixel, indicating the algorithm path:  
 0 - skipped  
 1 - linear fitting, vertical column SO2, short wavelength window  
 2 - linear fitting, vertical column SO2, long wavelength window  
 Add 10 for snow/ice

- Field Name: AlgorithmFlag\_STL  
 Data Type: HE5T\_NATIVE\_UINT8  
 Dimensions: nTimes,nXtrack  
 Range or Valid: Range is 0 to 16.  
 Missing Value: 255  
 Offset: 0.0d+00  
 Scale Factor: 1.0d+00  
 Units: NoUnits  
 Data Source: PGE  
 Title: "Algorithm Flag for STL"  
 Unique Field Definition: OMI-Specific  
 Description: >  
 The STL processing flag for each ground pixel, indicating the algorithm path:  
 0 - skipped  
 1 - linear fitting, vertical column SO2, short wavelength window  
 2 - linear fitting, vertical column SO2, long wavelength window  
 Add 10 for snow/ice

- Field Name: ChiSquare  
 Data Type: HE5T\_NATIVE\_FLOAT  
 Dimensions: nTimes,nXtrack  
 Range or Valid: Range is 0 to 100.0.  
 Missing Value: "-0X1P+100 (C language representation)"  
 Offset: 0.0d+00  
 Scale Factor: 1.0d+00  
 Units: NoUnits  
 Data Source: PGE  
 Title: "Chi square of the fitting residuals"

Unique Field Definition: OMI-Specific

Description: The Chi square for STL from the linear least square fit.

- Field Name: fc  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nXtrack,nTimes  
Minimum Value: 0.0  
Maximum Value: 1.0  
Missing Value: -1.2676506e+30  
Offset: 0.0  
Scale Factor: 1.0  
Units: NoUnits  
Data Source: PGE

Title: MLER Cloud Fraction

Unique Field Definition: TOMS-OMI-Shared

Description: The MLER model parameter: effective cloud fraction.

- Field Name: RadiativeCloudFraction  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nTimes,nXtrack  
Range or Valid: Range is 0 to 1.0.  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d+00  
Scale Factor: 1.0d+00  
Units: NoUnits  
Data Source: PGE

Title: "Effective Cloud Fraction"

Unique Field Definition: TOMS-OMI-Shared

Description: The effective cloud fraction.

- Field Name: CloudPressure  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nXtrack,nTimes  
Range or Valid: Range is 0.0 to 1013.25  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d0  
Scale Factor: 1.0d0  
Units: hPa  
Data Source: PGE

Title: "Radiative Cloud Pressure"

Unique Field Definition: OMI-Specific

Description: >

The effective cloud pressure associated with the ground pixel.

- Field Name: ColumnAmountO3  
Data Type: HE5T\_NATIVE\_FLOAT

Dimensions: nXtrack,nTimes  
Range or Valid: Range is 50.0 to 700.0  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d0  
Scale Factor: 1.0d0  
Units: DU  
Data Source: PGE  
Title: "Best Total Ozone Solution"  
Unique Field Definition: OMI-Specific  
Description: >  
The best retrieved total column O3 from OMT03.

- Field Name: deltaO3  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nXtrack,nTimes  
Range or Valid: Range is -1000.0 to 1000.0  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d0  
Scale Factor: 1.0d0  
Units: DU  
Data Source: PGE  
Title: "adjustment to ColumnAmount O3 "  
Unique Field Definition: OMI-Specific  
Description: >  
The ozone adjustment derived from fitting method.

- Field Name: ColumnAmountSO2\_TRL  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nXtrack,nTimes  
Range or Valid: Range is -10.0 to 2000.0  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d0  
Scale Factor: 1.0d0  
Units: DU  
Data Source: PGE  
Title: "Vertical Column Amount SO2 (TRL)"  
Unique Field Definition: OMI-Specific  
Description: >  
The retrieved vertical column amount SO2 with a prscribed SO2 profile similar to the standard ozone profile in Umkher layer 0 (roughly between 0 and 5 KM altitude).

- Field Name: ColumnAmountSO2\_TRM  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nXtrack,nTimes  
Range or Valid: Range is -10.0 to 2000.0

Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d0  
Scale Factor: 1.0d0  
Units: DU  
Data Source: PGE  
Title: "Vertical Column Amount SO2 (TRM)"  
Unique Field Definition: OMI-Specific  
Description: >  
The retrieved vertical column amount SO2 with a prscribed SO2 profile similar to the standard ozone profile in Umkher layer 1 (roughly between 5 and 10 KM altitude).

- Field Name: ColumnAmountSO2\_TRMbrd  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nXtrack,nTimes  
Range or Valid: Range is -10.0 to 2000.0  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d0  
Scale Factor: 1.0d0  
Units: DU  
Data Source: PGE  
Title: "BRD Vertical Column Amount SO2 (TRM)"  
Unique Field Definition: OMI-Specific  
Description: >  
The retrieved vertical column amount SO2 with a prscribed SO2 profile similar to the standard ozone profile in Umkher layer 1 (roughly between 5 and 10 KM altitude).

- Field Name: ColumnAmountSO2\_STL  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nXtrack,nTimes  
Range or Valid: Range is -10.0 to 2000.0  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d0  
Scale Factor: 1.0d0  
Units: DU  
Data Source: PGE  
Title: "Vertical Column Amount SO2 (STL)"  
Unique Field Definition: OMI-Specific  
Description: >  
The retrieved vertical column amount SO2 with a prscribed SO2 profile similar to the standard ozone profile in Umkher layer 3 (roughly between 15 and 20 KM altitude).

- Field Name: ColumnAmountSO2\_STLbrd  
Data Type: HE5T\_NATIVE\_FLOAT

Dimensions: nXtrack,nTimes  
Range or Valid: Range is -10.0 to 2000.0  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d0  
Scale Factor: 1.0d0  
Units: DU  
Data Source: PGE  
Title: "BRD Vertical Column Amount SO2 (STL)"  
Unique Field Definition: OMI-Specific  
Description: >  
The retrieved vertical column amount SO2 with a prscribed SO2 profile similar to the standard ozone profile in Umkher layer 3 (roughly between 15 and 20 KM altitude).

- Field Name: ColumnAmountSO2\_PBL  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nXtrack,nTimes  
Range or Valid: Range is -10.0 to 2000.0  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d0  
Scale Factor: 1.0d0  
Units: DU  
Data Source: PGE  
Title: "Vertical Column Amount SO2 (PBL)"  
Unique Field Definition: OMI-Specific  
Description: >  
The retrieved vertical column amount SO2 with a boundary-layer SO2 profile averaged from in-situ aircraft measurments over eastern United States.

- Field Name: ColumnAmountSO2\_PBLbrd  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nXtrack,nTimes  
Range or Valid: Range is -10.0 to 2000.0  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d0  
Scale Factor: 1.0d0  
Units: DU  
Data Source: PGE  
Title: "BRD Vertical Column Amount SO2 (PBL)"  
Unique Field Definition: OMI-Specific  
Description: >  
The retrieved vertical column amount SO2 with a boundary-layer SO2 profile averaged from in-situ aircraft measurments over eastern United States.

- Field Name: deltaRefl  
 Data Type: HE5T\_NATIVE\_FLOAT  
 Dimensions: nXtrack,nTimes  
 Range or Valid: Range is -1.0 to 1.0  
 Missing Value: "-0X1P+100 (C language representation)"  
 Offset: 0.0d0  
 Scale Factor: 1.0d0  
 Units: NoUnits  
 Data Source: PGE  
 Title: "adjustment to reflectivity at 331nm"  
 Unique Field Definition: OMI-Specific  
 Description: >  
 The reflectivity vs wavelength is described by a second order polynomial,  
 $R = R_{331} + c_1 * (\lambda - 331) + c_2 * (\lambda - 331)^2$ . The deltaRefl is  
 the reflectivity adjustment to the zero-th order term,  $R_{331}$ .
  
- Field Name: dN\_dSO2\_TRM  
 Data Type: HE5T\_NATIVE\_FLOAT  
 Dimensions: nTimes,nXtrack,nWavel  
 Range or Valid: Range is 0.0 to 10.  
 Missing Value: "-0X1P+100 (C language representation)"  
 Offset: 0.0d+00  
 Scale Factor: 1.0d+00  
 Units: 1/DU  
 Data Source: PGE  
 Title: "Umkehr Layer 1 SO2 Sensitivity Ratio, dN/dSO2"  
 Unique Field Definition: TOMS-OMI-Shared  
 Description: Umkehr Layer 1 SO2 sensitivity ratio, dN/dSO2.
  
- Field Name: dN\_dSO2\_STL  
 Data Type: HE5T\_NATIVE\_FLOAT  
 Dimensions: nTimes,nXtrack,nWavel  
 Range or Valid: Range is 0.0 to 10.  
 Missing Value: "-0X1P+100 (C language representation)"  
 Offset: 0.0d+00  
 Scale Factor: 1.0d+00  
 Units: 1/DU  
 Data Source: PGE  
 Title: "Umkehr Layer 3 SO2 Sensitivity Ratio, dN/dSO2"  
 Unique Field Definition: TOMS-OMI-Shared  
 Description: Umkehr Layer 3 SO2 sensitivity ratio, dN/dSO2.
  
- Field Name: dN\_dSO2\_TRL  
 Data Type: HE5T\_NATIVE\_FLOAT  
 Dimensions: nTimes,nXtrack,nWavel  
 Range or Valid: Range is 0.0 to 10.



Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d+00  
Scale Factor: 1.0d+00  
Units: 1/DU  
Data Source: PGE  
Title: "Umkehr Layer 0 SO2 Sensitivity Ratio, dN/dSO2"  
Unique Field Definition: TOMS-OMI-Shared  
Description: Umkehr Layer 0 SO2 sensitivity ratio, dN/dSO2.

- Field Name: LayerEfficiency  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nTimes,nXtrack,nLayers  
Range or Valid: Range is 0.0 to 10.0.  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d+00  
Scale Factor: 1.0d+00  
Units: NoUnits  
Data Source: PGE  
Title: "Algorithmic Layer Efficiency"  
Unique Field Definition: TOMS-OMI-Shared  
Description: The algorithmic layer efficiency.

- Field Name: QualityFlags\_PBL  
Data Type: HE5T\_NATIVE\_UINT16  
Dimensions: nTimes,nXtrack  
Range or Valid: Range is 0 to 65534.  
Missing Value: 65535  
Offset: 0.0d+00  
Scale Factor: 1.0d+00  
Units: NoUnits  
Data Source: PGE  
Title: "Quality Flags for PBL"  
Unique Field Definition: OMI-Specific  
Description: >

Each bit correspond to a flag that is set to 0 for good value,  
or 1 for bad value:

Bit 0 - SO2 consistency flag (0 for SO2 from 3 pairs are consistent, 1 for not)  
Bit 1 - geometric slant O3 column >= Threshold (currently set at 1500 D.U.)  
Bit 2 - UV Aerosol Index > 3  
Bit 3 - Reflectivity at 331 nm > 15 %  
Bit 4 to 6 together represents one number whose value ranging from 0 to 7  
- it is equal to the first 4 bits of the OMT03 QualityFalgs.  
Bit 7 - Descending  
Bit 8 - reflectivity error  
Bit 9 - geolocation error

Bit 10 - L1B warning, error, or missing  
 Bit 11 - set to be same as bit 6 of the OMT03 QualityFalgs  
 Bit 12 - set to be same as bit 7 of the OMT03 QualityFalgs  
 Bit 13 - place holder, set to zero currently  
 Bit 14 - place holder, set to zero currently  
 Bit 15 - place holder, set to zero currently

- Field Name: QualityFlags\_TRL  
 Data Type: HE5T\_NATIVE\_UINT16  
 Dimensions: nTimes,nXtrack  
 Range or Valid: Range is 0 to 65534.  
 Missing Value: 65535  
 Offset: 0.0d+00  
 Scale Factor: 1.0d+00  
 Units: NoUnits  
 Data Source: PGE  
 Title: "Quality Flags for TRL"  
 Unique Field Definition: OMI-Specific  
 Description: >

Each bit correspond to a flag that is set to 0 for good value,  
 or 1 for bad value:

Bit 0 - SO2 consistency flag (0 for SO2 from 3 pairs are consistent, 1 for not)  
 Bit 1 - geometric slant O3 column >= Threshold (currently set at 1500 D.U.)  
 Bit 2 - UV Aerosol Index > 3  
 Bit 3 - Reflectivity at 331 nm > 15 %  
 Bit 4 to 6 together represents one number whose value ranging from 0 to 7  
 - it is equal to the first 4 bits of the OMT03 QualityFalgs.  
 Bit 7 - Descending  
 Bit 8 - reflectivity error  
 Bit 9 - geolocation error  
 Bit 10 - L1B warning, error, or missing  
 Bit 11 - set to be same as bit 6 of the OMT03 QualityFalgs  
 Bit 12 - set to be same as bit 7 of the OMT03 QualityFalgs  
 Bit 13 - place holder, set to zero currently  
 Bit 14 - place holder, set to zero currently  
 Bit 15 - place holder, set to zero currently

- Field Name: QualityFlags\_TRM  
 Data Type: HE5T\_NATIVE\_UINT16  
 Dimensions: nTimes,nXtrack  
 Range or Valid: Range is 0 to 65534.  
 Missing Value: 65535  
 Offset: 0.0d+00  
 Scale Factor: 1.0d+00  
 Units: NoUnits

Data Source: PGE  
Title: "Quality Flags for TRM"  
Unique Field Definition: OMI-Specific  
Description: >

Each bit correspond to a flag that is set to 0 for good value,  
or 1 for bad value:

Bit 0 - SO2 consistency flag (0 for SO2 from 3 pairs are consistent, 1 for not)  
Bit 1 - geometric slant O3 column  $\geq$  Threshold (currently set at 1500 D.U.)  
Bit 2 - UV Aerosol Index  $> 3$   
Bit 3 - Reflectivity at 331 nm  $> 15 \%$   
Bit 4 to 6 together represents one number whose value ranging from 0 to 7  
- it is equal to the first 4 bits of the OMT03 QualityFalgs.  
Bit 7 - Descending  
Bit 8 - reflectivity error  
Bit 9 - geolocation error  
Bit 10 - L1B warning, error, or missing  
Bit 11 - set to be same as bit 6 of the OMT03 QualityFalgs  
Bit 12 - set to be same as bit 7 of the OMT03 QualityFalgs  
Bit 13 - place holder, set to zero currently  
Bit 14 - place holder, set to zero currently  
Bit 15 - place holder, set to zero currently

- Field Name: QualityFlags\_STL  
Data Type: HE5T\_NATIVE\_UINT16  
Dimensions: nTimes,nXtrack  
Range or Valid: Range is 0 to 65534.  
Missing Value: 65535  
Offset: 0.0d+00  
Scale Factor: 1.0d+00  
Units: NoUnits  
Data Source: PGE  
Title: "Quality Flags for STL"  
Unique Field Definition: OMI-Specific  
Description: >

Each bit correspond to a flag that is set to 0 for good value,  
or 1 for bad value:

Bit 0 - SO2 consistency flag (0 for SO2 from 3 pairs are consistent, 1 for not)  
Bit 1 - geometric slant O3 column  $\geq$  Threshold (currently set at 1500 D.U.)  
Bit 2 - UV Aerosol Index  $> 3$   
Bit 3 - Reflectivity at 331 nm  $> 15 \%$   
Bit 4 to 6 together represents one number whose value ranging from 0 to 7  
- it is equal to the first 4 bits of the OMT03 QualityFalgs.  
Bit 7 - Descending  
Bit 8 - reflectivity error

Bit 9 - geolocation error  
 Bit 10 - L1B warning, error, or missing  
 Bit 11 - set to be same as bit 6 of the OMT03 QualityFalgs  
 Bit 12 - set to be same as bit 7 of the OMT03 QualityFalgs  
 Bit 13 - place holder, set to zero currently  
 Bit 14 - place holder, set to zero currently  
 Bit 15 - place holder, set to zero currently

- Field Name: Rlambda1st  
 Data Type: HE5T\_NATIVE\_FLOAT  
 Dimensions: nXtrack,nTimes  
 Range or Valid: Range is -1.0 to 1.0  
 Missing Value: "-0X1P+100 (C language representation)"  
 Offset: 0.0d0  
 Scale Factor: 1.0d0  
 Units: NoUnits  
 Data Source: PGE  
 Title: "First order term of the R-Lambda function"  
 Unique Field Definition: OMI-Specific  
 Description: >  
 The reflectivity vs wavelength is described by a second order polynomial,  
 $R = R331 + c1 * (\lambda - 331) + c2 * (\lambda - 331)^2$ . Rlambda1st is the first  
 order coefficient c1.

- Field Name: Rlambda2nd  
 Data Type: HE5T\_NATIVE\_FLOAT  
 Dimensions: nXtrack,nTimes  
 Range or Valid: Range is -1.0 to 1.0  
 Missing Value: "-0X1P+100 (C language representation)"  
 Offset: 0.0d0  
 Scale Factor: 1.0d0  
 Units: NoUnits  
 Data Source: PGE  
 Title: "Second order term of the R-Lambda function"  
 Unique Field Definition: OMI-Specific  
 Description: >  
 The reflectivity vs wavelength is described by a second order polynomial,  
 $R = R331 + c1 * (\lambda - 331) + c2 * (\lambda - 331)^2$ . Rlambda2nd is the second  
 order coefficient c2.

- Field Name: Reflectivity331  
 Data Type: HE5T\_NATIVE\_FLOAT  
 Dimensions: nXtrack,nTimes  
 Range or Valid: Range is -15.0 to 115.0  
 Missing Value: "-0X1P+100 (C language representation)"  
 Offset: 0.0d0

Scale Factor: 1.0d0  
Units: percent  
Data Source: PGE  
Title: "Effective Surface Reflectivity at 331 nm"  
Unique Field Definition: OMI-Specific  
Description: >  
Effective surface reflectivity of the surface at the center of the pixel.

- Field Name: Residual  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nTimes,nXtrack,nWavel  
Range or Valid: Range is -150.0 to 150.0.  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d+00  
Scale Factor: 1.0d+00  
Units: NoUnits  
Data Source: PGE  
Title: "N-Value Residual"  
Unique Field Definition: TOMS-OMI-Shared  
Description: The N-value residual from OMTO3.

- Field Name: ResidualAdjustment  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nTimes,nXtrack,nWavel  
Range or Valid: Range is -50.0 to 50.0.  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d+00  
Scale Factor: 1.0d+00  
Units: NoUnits  
Data Source: PGE  
Title: "N-Value Residual Adjustment"  
Unique Field Definition: TOMS-OMI-Shared  
Description: The N-value adjustment made to OMTO3 residual.

- Field Name: SO2indexP1  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nXtrack,nTimes  
Range or Valid: Range is -30.0 to 30.0  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d0  
Scale Factor: 1.0d0  
Units: NoUnits  
Data Source: PGE  
Title: "Pair 1 SO2 Index"  
Unique Field Definition: OMI-Specific

Description: >  
The pair 1 (311.9 and 310.8 nm) SO2 Index.

- Field Name: SO2indexP2  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nXtrack,nTimes  
Range or Valid: Range is -30.0 to 30.0  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d0  
Scale Factor: 1.0d0  
Units: NoUnits  
Data Source: PGE  
Title: "Pair 2 SO2 Index"  
Unique Field Definition: OMI-Specific  
Description: >  
The pair 2 (313.2 and 311.9 nm) SO2 Index.

- Field Name: SO2indexP3  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nXtrack,nTimes  
Range or Valid: Range is -30.0 to 30.0  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d0  
Scale Factor: 1.0d0  
Units: NoUnits  
Data Source: PGE  
Title: "Pair 3 SO2 Index"  
Unique Field Definition: OMI-Specific  
Description: >  
The pair 3 (314.4 and 313.2 nm) SO2 Index.

- Field Name: TerrainPressure  
Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nXtrack,nTimes  
Range or Valid: Range is 0.0 to 2000.0  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d0  
Scale Factor: 1.0d0  
Units: hPa  
Data Source: PGE  
Title: "Terrain Pressure"  
Unique Field Definition: OMI-Specific  
Description: >  
The terrain pressure at the center of the ground pixel.

- Field Name: UVAerosolIndex

Data Type: HE5T\_NATIVE\_FLOAT  
Dimensions: nTimes,nXtrack  
Range or Valid: Range is -50.0 to 50.0.  
Missing Value: "-0X1P+100 (C language representation)"  
Offset: 0.0d+00  
Scale Factor: 1.0d+00  
Units: NoUnits  
Data Source: PGE  
Title: "UV Aerosol Index"  
Unique Field Definition: TOMS-OMI-Shared  
Description: >  
The UV aerosol index associated with the ground pixel.

#### Core Metadata:

- Metadata Name: AssociatedInstrumentShortName  
Mandatory: T  
Data Type: VA20  
Number of Values: 1  
Range or Valid: Valid is "OMI".  
Data Source: MCF  
Description: Actual is "OMI".
- Metadata Name: AssociatedPlatformShortName  
Mandatory: T  
Data Type: VA20  
Number of Values: 1  
Range or Valid: Valid is "Aura".  
Data Source: MCF  
Description: Actual is "Aura".
- Metadata Name: AssociatedSensorShortName  
Mandatory: T  
Data Type: VA20  
Number of Values: 1  
Range or Valid: Valid is "CCD Ultra Violet" and "CCD Visible".  
Data Source: MCF  
Description: Actual is "CCD Ultra Violet".
- Metadata Name: AutomaticQualityFlag  
Mandatory: T  
Data Type: VA64  
Number of Values: 1  
Range or Valid: Valid is "Passed", "Suspect" and "Failed".  
Data Source: PGE  
Description: >

A granule-level quality flag that applies generally to the granule and specifically to the parameters at the granule level.

- Metadata Name: AutomaticQualityFlagExplanation  
Mandatory: T  
Data Type: VA255  
Number of Values: 1  
Range or Valid: Not applicable (free format).  
Data Source: PGE  
Description: >  
The definitions of "Passed", "Suspect" and "Failed" should go here.
- Metadata Name: DayNightFlag  
Mandatory: T  
Data Type: VA5  
Number of Values: 1  
Range or Valid: Valid are "Day", "Night" and "Both".  
Data Source: MCF  
Description: Actual is "Day".
- Metadata Name: EquatorCrossingDate  
Mandatory: T  
Data Type: D  
Number of Values: 1  
Range or Valid: Range is "1995-01-01" to "2099-12-31".  
Data Source: L1B  
Description: >  
The date of the descending equator crossing in the granule.
- Metadata Name: EquatorCrossingLongitude  
Mandatory: T  
Data Type: LF  
Number of Values: 1  
Range or Valid: Range is -180.0d0 to 180.0d0.  
Data Source: L1B  
Description: >  
The longitude of the descending equator crossing in the granule.
- Metadata Name: EquatorCrossingTime  
Mandatory: T  
Data Type: T  
Number of Values: 1  
Range or Valid: Range is "01:00:0.000000" to "01:59:59.999999".  
Data Source: L1B  
Description: >  
The time of the descending equator crossing in the granule.



- Metadata Name: InputPointer  
Mandatory: T  
Data Type: VA255  
Number of Values: 0 to 10  
Range or Valid: >  
Valid file names, each in double quotes, separated by commas, all surrounded by curved brackets.  
Data Source: PGE  
Description: >  
Example is  
("OMI-Aura\_L1-OML1BRUG\_2003m0415t0507-o01067\_v001-2003m0630t230758.he4",  
"OMI-Aura\_L1-OML1BIRR\_2003m0415t0542-o01067\_v001-2003m0630t185511.he4",  
"", "", "", "", "", "", "", "", "").
  
- Metadata Name: LocalGranuleID  
Mandatory: T  
Data Type: VA80  
Number of Values: 1  
Range or Valid: >  
Range is  
"OMI-Aura\_L2-OMSO2\_1995m0101t0000-o00000\_v001-1995m0101t000000.he5" to  
"OMI-Aura\_L2-OMSO2\_2099m1231t2359-o99999\_v999-2099m1231t235959.he5".  
Data Source: PGE  
Description: >  
Example is  
"OMI-Aura\_L2-OMSO2\_2002m0630t2354-o21434\_v001-2003m0515t181917.he5"  
(see Appendix E of Reference 3).
  
- Metadata Name: LOCALVERSIONID  
Mandatory: T  
Data Type: VA60  
Number of Values: 1  
Range or Valid: >  
Valid: "RFC1321 MD5 = not yet calculated" and  
"RFC1321 MD5 = [0-9,a-f]{32}"  
Data Source: PCF  
Description: >  
MD5 fingerprint of the HDF product file.
  
- Metadata Name: OperationalQualityFlag  
Mandatory: T  
Data Type: VA20  
Number of Values: 1

Range or Valid: >

Valid are "Passed", "Failed", "Being Investigated", "Not Investigated", "Inferred Passed", "Inferred Failed" and "Suspect".

Data Source: L1B

Description: >

A granule-level quality flag that applies generally to the granule and specifically to the parameters at the granule level.

- Metadata Name: OperationalQualityFlagExplanation

Mandatory: T

Data Type: VA255

Number of Values: 1

Range or Valid: Not applicable (free format).

Data Source: L1B

Description: >

The criteria for setting the OperationalQualityFlag should be stated here (this Metadata will not appear in the granule).

- Metadata Name: OPERATIONMODE

Mandatory: T

Data Type: VA20

Number of Values: 1

Range or Valid: >

Valid are "Calibration", "Diagnostic", "Initialization", "Launch", "Normal", "Roll", "Routine", "Safe", "Solar Calibration", "Standby", "Survival" and "Test".

Data Source: PCF

Description: Actual is "Test".

- Metadata Name: OrbitNumber

Mandatory: T

Data Type: I

Number of Values: 1

Range or Valid: Range is 1 to 999999

Data Source: L1B

Description: The OMI orbit number.

- Metadata Name: ParameterName

Mandatory: T

Data Type: VA40

Number of Values: 1

Range or Valid: Valid is "Total Column Sulphur Dioxide".

Data Source: PGE

Description: >

The measured science parameter expressed in the granule.

- Metadata Name: PGEVERSION  
Mandatory: T  
Data Type: VA10  
Number of Values: 1  
Range or Valid: Range is "0.0.0" to "9.9.99".  
Data Source: PCF  
Description: Actual is "1.0.1".
  
- Metadata Name: ProductionDateTime  
Mandatory: T  
Data Type: DT  
Number of Values: 1  
Range or Valid: >  
"2003-01-01T00:00:00.000Z" to "2099-12-31T24:59:59.999Z"  
Data Source: TK  
Description: The date and time of the Level 2 processing.
  
- Metadata Name: QAPercentCloudCover  
Mandatory: T  
Data Type: I  
Number of Values: 1  
Range or Valid: Range is 0 to 100  
Data Source: PGE  
Description: >  
The percent of the data in the granule that have cloud cover.
  
- Metadata Name: QAPercentInterpolatedData  
Mandatory: T  
Data Type: I  
Number of Values: 1  
Range or Valid: Range is 0 to 100  
Data Source: PGE  
Description: >  
The percent of the data in the granule that are interpolated.
  
- Metadata Name: QAPercentMissingData  
Mandatory: T  
Data Type: I  
Number of Values: 1  
Range or Valid: Range is 0 to 100.  
Data Source: PGE  
Description: >  
The percent of the data in the granule that are missing.
  
- Metadata Name: QAPercentOutOfBoundsData  
Mandatory: T

Data Type: I  
Number of Values: 1  
Range or Valid: Range is 0 to 100.  
Data Source: PGE  
Description: >  
The percent of the data in the granule that are out of bounds data.

- Metadata Name: RangeBeginningDate  
Mandatory: T  
Data Type: D  
Number of Values: 1  
Range or Valid: Range is "1995-01-01" to "2099-12-31".  
Data Source: L1B  
Description: The year, month and day when the granule began.

- Metadata Name: RangeBeginningTime  
Mandatory: T  
Data Type: T  
Number of Values: 1  
Range or Valid: Range is "00:00:00.000000" to "23:59:59.999999".  
Data Source: L1B  
Description: >  
The hour, minute, second and fraction of a second when the granule began.

- Metadata Name: RangeEndingDate  
Mandatory: T  
Data Type: D  
Number of Values: 1  
Range or Valid: Range is "1995-01-01" to "2099-12-31".  
Data Source: L1B  
Description: The year, month and day when the granule ended.

- Metadata Name: RangeEndingTime  
Mandatory: T  
Data Type: T  
Number of Values: 1  
Range or Valid: Range is "00:00:00.000000" to "23:59:59.999999".  
Data Source: L1B  
Description: >  
The hour, minute, second and fraction of a second when the granule ended.

- Metadata Name: REPROCESSINGACTUAL  
Mandatory: T  
Data Type: VA20

Number of Values: 1

Range or Valid: >

Valid are "processed 1 time", "processed 2 times", etc...

Data Source: PCF

Description: >

An indication of what reprocessing has been performed on the granule.

- Metadata Name: ReprocessingPlanned

Mandatory: T

Data Type: VA45

Number of Values: 1

Range or Valid: >

Valid are "no further update anticipated", "further update is anticipated" and "further update anticipated using enhanced PGE".

Data Source: DP

Description: Actual is "further update is anticipated".

- Metadata Name: ScienceQualityFlag

Mandatory: T

Data Type: VA20

Number of Values: 1

Range or Valid: >

Valid are "Passed", "Failed", "Being Investigated", "Not Investigated", "Inferred Passed", "Inferred Failed" and "Suspect".

Data Source: DP

Description: Actual is "Not Investigated".

- Metadata Name: ScienceQualityFlagExplanation

Mandatory: T

Data Type: VA255

Number of Values: 1

Range or Valid: Not applicable (free format).

Data Source: DP

Description: >

An explanation of the criteria used to set the science quality flag should go here.

- Metadata Name: ShortName

Mandatory: T

Data Type: VA8

Number of Values: 1

Range or Valid: Valid is "OMSO2".

Data Source: MCF

Description: Actual is "OMSO2".

- Metadata Name: SizeMBECSDDataGranule

Mandatory: F  
Data Type: LF  
Number of Values: 1  
Range or Valid: Range is 0.00d+00 to 1.00d+04.  
Data Source: DSS  
Description: >  
The volume of data contained in the granule in Mb (this Metadata will not appear in the granule).

- Metadata Name: VersionID  
Mandatory: T  
Data Type: SI  
Number of Values: 1  
Range or Valid: Range is 0 to 999.  
Data Source: MCF  
Description: Actual is 1 for test and pre-launch.

#### Product Specific Attributes:

# - Metadata Name: AverageCloudCover  
# Mandatory: T  
# Data Type: F  
# Number of Values: 1  
# Range or Valid: Range is 0.0 to 100.0.  
# Data Source: PGE  
# Description: >  
# Indicates the average cloud cover of the scene.

# - Metadata Name: ClearSceneFlag  
# Mandatory: T  
# Data Type: VA6  
# Number of Values: 1  
# Range or Valid: Valid are "clear" and "cloudy".  
# Data Source: PGE  
# Description: >  
# This flag indicates whether the scene is "clear" or "cloudy".

- Metadata Name: EndBlockNr  
Mandatory: T  
Data Type: SI  
Number of Values: 1 to 500  
Range or Valid: Range is 1 to 50.  
Data Source: L1B  
Description: The number of the NOSE end block along the track.

# - Metadata Name: EndPollLatitude  
# Mandatory: T  
# Data Type: F  
# Number of Values: 1  
# Range or Valid: Range is -90.0 to 90.0.  
# Data Source: PGE  
# Description: >  
# Indicates the ending bounding latitude of the pollution activity.

# - Metadata Name: EndVolLatitude  
# Mandatory: T  
# Data Type: F  
# Number of Values: 1  
# Range or Valid: Range is -90.0 to 90.0.  
# Data Source: PGE  
# Description: >  
# Indicates the ending bounding latitude of the volcanic activity.

# - Metadata Name: ExpeditedData  
# Mandatory: T  
# Data Type: VA10  
# Number of Values: 1  
# Range or Valid: Valid are "TRUE" and "FALSE".  
# Data Source: L1B  
# Description: The indicator for expedited L0 data.

# - Metadata Name: ExposureTimes  
# Mandatory: T  
# Data Type: F  
# Number of Values: 1 to 256  
# Range or Valid: Range is 0.0 to 2000.0.  
# Data Source: L1B  
# Description: >  
# An array containing the exposure times in seconds used for the  
# measurements.

# - Metadata Name: InstrumentConfigurationIDs  
# Mandatory: T  
# Data Type: SI  
# Number of Values: 1 to 256  
# Range or Valid: Range is 0 to 255.  
# Data Source: L1B  
# Description: >  
# An array containing the instrument configuration identifiers used  
# for the measurements.

# - Metadata Name: MasterClockPeriods  
# Mandatory: T  
# Data Type: F  
# Number of Values: 1 to 128  
# Range or Valid: Range is 0.0 to 10.0.  
# Data Source: L1B  
# Description: >  
# An array containing the master clock periods in seconds used for  
# the measurements.

# - Metadata Name: NrMeasurements  
# Mandatory: T  
# Data Type: I  
# Number of Values: 1  
# Range or Valid: Range is 0 to 9999.  
# Data Source: L1B  
# Description: >  
# The number of measurements in the granule (per output product).

# - Metadata Name: NrSpatialZoom  
# Mandatory: T  
# Data Type: I  
# Number of Values: 1  
# Range or Valid: Range is 0 to 9999.  
# Data Source: L1B  
# Description: The number of measurements in spatial zoom mode.

# - Metadata Name: NrSpectralZoom  
# Mandatory: T  
# Data Type: I  
# Number of Values: 1  
# Range or Valid: Range is 0 to 9999.  
# Data Source: L1B  
# Description: The number of measurements in spectral zoom mode.

# - Metadata Name: NrZoom  
# Mandatory: T  
# Data Type: I  
# Number of Values: 1  
# Range or Valid: Range is 0 to 9999.  
# Data Source: L1B  
# Description: The number of measurements in zoom modes.

- Metadata Name: PathNr  
Mandatory: T  
Data Type: I



Number of Values: 1 to 500  
Range or Valid: Range is 1 to 466.  
Data Source: L1B  
Description: Number of the NOSE path within the repeat cycle.

# - Metadata Name: PollutionActivityFlag  
# Mandatory: T  
# Data Type: VA4  
# Number of Values: 1  
# Range or Valid: Valid are "yes" and "none".  
# Data Source: PGE  
# Description: >  
# This flag indicates whether the retrieved total column amount SO2  
# indicates pollution activity. Examples are "yes" or "none".

- Metadata Name: SolarEclipse  
Mandatory: T  
Data Type: VA10  
Number of Values: 1  
Range or Valid: Valid are "TRUE" and "FALSE".  
Data Source: L1B  
Description: >  
The indicator that during part of the measurements a solar eclipse occurred.

- Metadata Name: SouthAtlanticAnomalyCrossing  
Mandatory: T  
Data Type: VA10  
Number of Values: 1  
Range or Valid: Valid are "TRUE" and "FALSE".  
Data Source: L1B  
Description: >  
The indicator that during part of the measurements the spacecraft was in the SAA.

# - Metadata Name: SpacecraftManeuverFlag  
# Mandatory: T  
# Data Type: VA10  
# Number of Values: 1  
# Range or Valid: Valid are "TRUE", "FALSE" and "UNKNOWN".  
# Data Source: L1B  
# Description: >  
# The indicator that during part of the measurements the spacecraft  
# was performing a maneuver.

- Metadata Name: StartBlockNr

Mandatory: T  
Data Type: SI  
Number of Values: 1 to 500  
Range or Valid: Range is 1 to 50.  
Data Source: L1B  
Description: Number of the NOSE start block along the track.

# - Metadata Name: StartPollLatitude  
# Mandatory: T  
# Data Type: F  
# Number of Values: 20  
# Range or Valid: Range is -90.0 to 90.0.  
# Data Source: PGE  
# Description: >  
# Indicates the starting bounding latitude of the pollution activity.

# - Metadata Name: StartVolLatitude  
# Mandatory: T  
# Data Type: F  
# Number of Values: 20  
# Range or Valid: Range is -90.0 to 90.0.  
# Data Source: PGE  
# Description: >  
# Indicates the starting bounding latitude of the volcanic activity.

# - Metadata Name: VolcanicActivityFlag  
# Mandatory: T  
# Data Type: VA4  
# Number of Values: 1  
# Range or Valid: Valid are "yes" and "none".  
# Data Source: PGE  
# Description: >  
# This flag indicates whether the retrieved total column amount SO2  
# indicates volcanic activity. Examples are "yes" or "none".

#### Archived Metadata:

- Metadata Name: ESDTDescriptorRevision  
Mandatory: T  
Data Type: VA20  
Number of Values: 1  
Range or Valid: Range is "0.0.0" to "9.9.99".  
Data Source: MCF  
Description: >  
This is the version of the ESDT descriptor file as determined by ECS.

- Metadata Name: LongName  
Mandatory: T  
Data Type: VA80  
Number of Values: 1  
Range or Valid: >  
Valid is  
"OMI/Aura Sulphur Dioxide (SO<sub>2</sub>) Total Column 1-Orbit L2 Swath 13x24 km".  
Data Source: MCF  
Description: >  
Actual is  
"OMI/Aura Sulphur Dioxide (SO<sub>2</sub>) Total Column 1-Orbit L2 Swath 13x24 km"  
(see Section 7.0 of Reference 2).

References: >

1. "OMI Algorithm Theoretical Basis Document, Volume IV, OMI Trace Gas Algorithms"  
(OMI-ATBD-VOL4, ATBD-OMI-04, Version 2.0, August 2002)
2. "HDF-EOS Aura File Format Guidelines"  
(OMI-AURA-DATA-GUIDE, Version 1.3, 16 October 2003)
3. "OMI Science Software Delivery Guide for Version 0.9"  
(OMI-SSDG-0.9.9, Version 0.9.9, 21 October 2003)
4. "OMI GDPS Input/Output Data Specification (IODS) Volume 2"  
(OMI-GDPS-IODS-2, SD-OMIE-7200-DS-467, 9 April 2003)
5. "Release 6A Implementation Earth Science Data Model for the ECS Project"  
(420-TP-022-002, June 2001)  
(<http://edhs1.gsfc.nasa.gov/waisdata/rel6/html/tp4202202.html> and  
[http://edhs1.gsfc.nasa.gov/waisdata/rel6/html/tp42022\\_adds.html](http://edhs1.gsfc.nasa.gov/waisdata/rel6/html/tp42022_adds.html))
6. "OMI L2 - L4 Metadata Reference Guide"  
(3 July 2002)  
(<https://omiwww.gsfc.nasa.gov/mlinda/OMImetadataRefGuide.html>)